FINAL REPORT

COOPERATIVE AGREEMENT NO. BF-00D47816-0

2016-2019 Environmental Cleanup Grants Report for
FORMER McCLUNG WAREHOUSES *and* SANITARY LAUNDRY PROPERTIES

PREPARED FOR

CITY OF KNOXVILLE

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ENVIRONMENTAL PROTECTION AGENCY
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Implementation of Environmental Cleanup Completed at Former Sanitary Laundry and McClung Warehouses Properties

S&ME Inc. (S&ME) has completed implementation of the Environmental Protection Agency (EPA) Brownfield Cleanup Grant for the Former McClung Warehouses Property and the former Sanitary Laundry Property located in Knoxville, Tennessee. Services for the two projects were performed under the 2016 Brownfields Cleanup Grant (Grant) provided by the Region 4 EPA, under EPA Brownfields Cooperative Agreement No. BF-00D47816-0 and matching City of Knoxville (City) funding. This report summarizes the activities included in the implementation of the Grant for both sites.

The vision for the City of Knoxville is to bring appropriate redevelopment of brownfield sites to bring vitality and livability back to those parts of the community that have seen economic decline and create safe, secure, healthy neighborhoods where mixed-use development thrives.

former SANITARY LAUNDRY PROPERTY

The former Sanitary Laundry site is located at 625 North Broadway in Knoxville, Tennessee. The property is occupied by a vacant, 30,000 square-foot structure (15,000 square feet on two levels) used for dry cleaning operations between 1926 and 1993. The Grant provided $200,000 for the cleanup, matched with $40,000 in City funding.

Soil and groundwater investigations previously conducted at the former Sanitary Laundry site have identified media (i.e., soil, groundwater, sub-slab/soil gas, and indoor air) contaminated with dry cleaning compounds, solvents, and petroleum products. The Tennessee Department of Environment and Conservation (TDEC) Division of Remediation (DOR) has been involved with this site in a regulatory capacity for many years. In an effort to support the City's redevelopment efforts, and to secure an approach to site redevelopment that is consistent with applicable regulations, TDEC has executed a Brownfield Voluntary Agreement (BVA) (Site No. 47-545) for the subject property. TDEC and the City have agreed that the BVA is to be made a condition of sale of the property. The BVA documents the environmental conditions and establishes requirements for site redevelopment to address the contamination.

Using the Grant funds, additional assessment was performed to address data gaps and provide information for the cleanup design and implementation. Contaminant concentrations detected in sub-slab gas and previous indoor air samples were compared to the May 2018 EPA Regional Screening Level (RSLs) for industrial air. Where detected sub-slab constituents exceeded the corresponding target soil gas concentrations, they also were evaluated for vapor intrusion (VI) hazard. The residential land use scenario was not evaluated because based on current and historic contaminant levels, the contaminant screening results under a commercial scenario, the BVA, TDEC input and current City plans, the site is anticipated to be limited to commercial uses. A screening tool known as the Vapor Intrusion Screening Level (VISL) calculator was used to evaluate the estimated attenuation of sub-slab contaminant concentrations to indoor air. Using the sub-slab soil gas results under a commercial scenario, the VISL screening identified carcinogenic risk for multiple dry-cleaning related contaminants.

The Grant funds were used to address the identified VI risk and other environmental issues associated with the site. Using the Grant funds, several cleanup related tasks were accomplished at the site. Summaries of each cleanup activity are presented in the following sections.

GROUND FLOOR OF SANITARY LAUNDRY BUILDING

BASEMENT AFTER DEBRIS REMOVAL

Removal and Disposal of Asbestos-Containing Material

During the initial walk-through following receipt of the Grant funds, S&ME observed that sections of overhead piping with thermal system insulation (TSI) asbestos-containing materials (ACM) had been cut and removed, possibly for salvage by unauthorized users taking shelter in the vacant building. Asbestos wrap from the former piping systems was observed discarded on the ground beneath the former piping runs. In order to make the site safe for future cleanup activities, removal of the ACM was required. Between December 18, 2017 and December 29, 2017, NEO Corporation (NEO) abated approximately 895 linear feet (LF) of asbestos-containing TSI, 1,665 square feet (SF) of floor tile/mastic, 800 SF of ceiling cork board, and 400 SF of boiler wrap at the site. NEO Corporation utilized negative pressure, wet glove bag methods, high-efficiency particulate air (HEPA) vacuum, and a prompt clean up. NEO performed a final inspection of the jobsite upon completion, and fine cleaning was performed after the asbestos abatement. All waste was double-bagged and disposed of at an approved landfill permitted to receive ACM. All asbestos was removed according to local, state, and federal regulations.

SAMPLING AND REMOVAL OF GRANULAR MATERIAL IN BASEMENT

VAPOR MITIGATION SYSTEM INSTALLATION

ROOF REPAIR AND STORM DRAIN INSTALLATION

GRANULAR MATERIAL DRUMS

VAPOR MITIGATION SYSTEM TEST LOCATION

VAPOR MITIGATION SYSTEM INSTALLATION

Removal and Disposal of Waste Material in the Basement

In January 2018, following the asbestos abatement, crews from the City removed and disposed of 21.26 tons (estimated 42,520 pounds) of solid waste previously stored in the basement of the Sanitary Laundry building. The material was removed by the City Solid Waste/Household Hazardous Waste Departments and processed through their waste disposal program. The material included pallets of paint, antifreeze, sealants, etc., as well as various building materials stockpiled in the basement.

Removal and Disposal of Special Waste Generated During Roof Renovation

During the roof renovation performed by others, the roofing contractor removed portions of concrete slab comprising the basement floor in two locations and one location in the pavement outside of the building to accommodate proposed installation of the roof drains. Upon learning of this activity, the City instructed the contractor to stop sub-slab excavations and contacted S&ME, and an alternative approach for the roof drain installations was established. This activity was handled outside of the Grant, with the exception of the drum sampling performed in January 2018 to characterize the soil excavated by the roofing contractor and placed into three 55-gallon steel drums by S&ME to appropriately manage the material. The waste characterization soil samples detected volatile organic compounds (VOCs) consistent with the previous site characterization activities. The three drums were removed for proper disposal as special waste by Domermuth Environmental Services, located Knoxville, Tennessee.

Removal and Disposal of Drums of Black Granular Material

A total of six drums containing black granular material were formerly located in the basement, and these were removed for disposal in August 2019. Metals and low-level polynuclear aromatic hydrocarbons (PAHs) were detected in samples collected to characterize the material. A portion of the surfaces of the drums containing the material exhibited evidence of corrosion and deterioration due to rust which prevented the full waste-containing drums from being placed in overpack drums for disposal. S&ME subcontracted with Environmental Remediation Consultants, Inc. (ERC) to remove the material from the rusted drums and dispose of the granular material and the rusted drums. ERC classified the material as unused absorbents. The granular material was removed from the rusted drums using a drum vacuum. A total of eight new drums were utilized to containerize the granular material. The drums were transported under manifest as non-hazardous material to a permitted disposal facility.

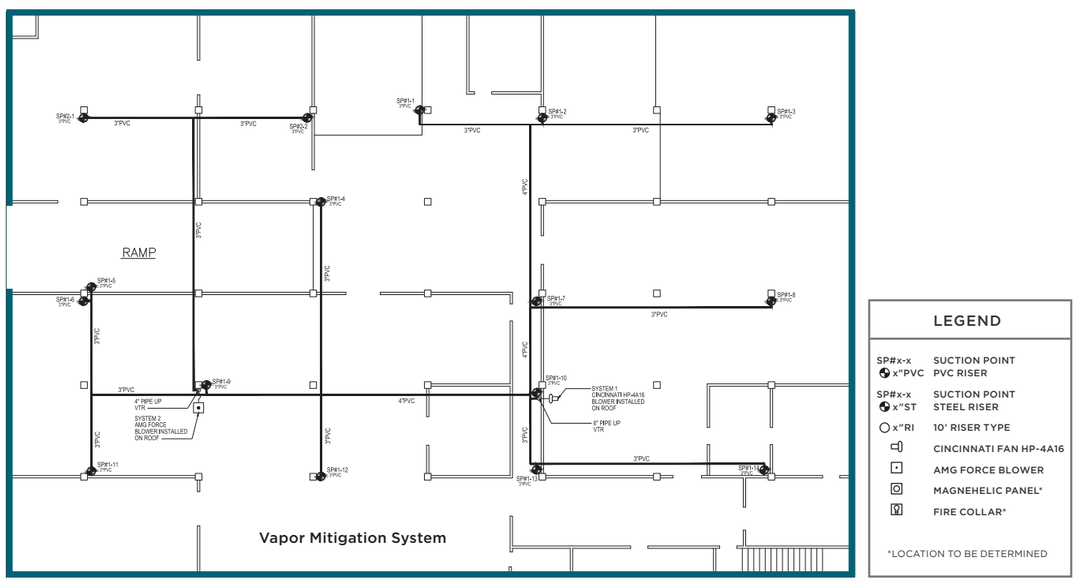
Partial Installation of Vapor Mitigation System

Due to the potential for vapor intrusion-related health risks to future occupants of the building as determined from previous vapor sampling, a large portion of the Grant funds were used for the evaluation, design and partial installation of a sub-slab vapor mitigation system. Designs and quotes were obtained from two vendors, and Clean Vapor LLC (Clean Vapor) was selected following the evaluation of both systems and vendors. During August 2019, Clean Vapor installed 16 risers and suction points in accordance with their design for the vapor mitigation system. Since cleanup funds were limited, and because the building is currently un-occupied and therefore more prone to vandalism and/or theft, partial installation of the system was performed, eliminating the above-

REVIEW OF VAPOR SYSTEM TEST LOCATIONS

ground mechanical and electrical equipment until redevelopment plans have been finalized and building improvements are underway. The first-floor slab may warrant improvements based on the redevelopment plans, and therefore the Clean Vapor system installation did not include overhead piping runs. These were to have been attached to the basement ceiling but would have potentially been impacted or removed during building renovations.

The soil and concrete debris generated during the system installation was placed into two 55-gallon drums and sampled to characterize the waste for disposal purposes. Chemical laboratory analytical results were consistent with previous samples collected from the site, except for an elevated petroleum hydrocarbon concentration in one of the samples. Field observations did not indicate unusual staining or odor from this material, and S&ME considered the possibility that there was cross-contamination from equipment or staining on the basement floor while the material was transferred to the drum. S&ME is also aware that early 1900's architects/builders often used tar-like barriers with chemical compounds high in PAHs for moisture control beneath concrete slabs. In any case, the drummed soil was transported and disposed by Domermuth as special waste, in accordance with the procedures used for previous drums of soil generated during the roof renovation.



What's Next for the Former Sanitary Laundry Site?

S&ME understands the City envisions commercial or retail redevelopment of the subject property. As part of the redevelopment effort, the BVA will need to be finalized, and a Land Use Restriction and Site Management Plan (SMP) will be required. These documents will require DOR approval before construction activities begin. The proposed redevelopment should be described in the SMP, and the potential for contact with impacted media should be addressed. The SMP should include, but not be limited to, procedures for temporary staging or containerization and characterization of any excavated materials, handling to ensure that any offsite disposal of impacted media meets all State and Federal requirements, and, if needed, installation of a barrier or engineered cap. The VI potential should continue to be addressed during redevelopment planning and in the SMP, with an evaluation of the partially-installed vapor mitigation system and completion of the system installation. Coordination with DOR should also be performed during redevelopment planning. A Health and Safety Plan should also be submitted to the DOR for review and comment before construction.

Lead-based paint (LBP) remains in the building and should also be addressed as part of any proposed redevelopment plan.

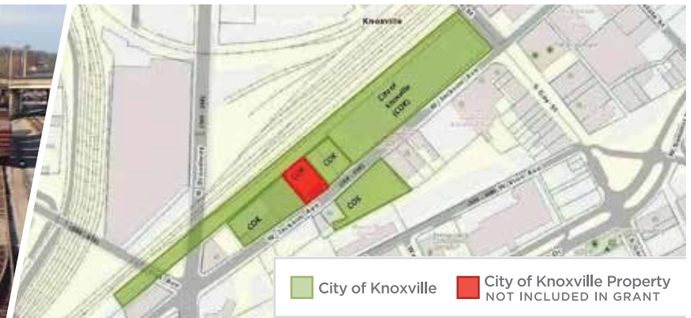
former McCLUNG WAREHOUSES PROPERTY

Site History

The former McClung Warehouses property consists of nine former parcels containing approximately five acres, owned by the City and formerly addressed at 401, 420, 501, 505, 512, 517, 519, 523 and 525 W. Jackson Avenue in Knoxville, Tennessee. In addition, the property includes a 30-foot-wide public alley right-of-way (ROW) located behind the former parcels at 501, 505, 517, 519, and 523 W. Jackson. The Grant provided $150,000 for the cleanup, matched with $30,000 in City funding. The City envisions the property will be revitalized with mixed-use commercial and residential redevelopment.

Businesses that formerly operated at the McClung Warehouses site included an automobile garage, woodworking shop, freight shipping businesses, and railroad freight storage, shipment, and administrative operations. In 2007, a fire destroyed the warehouses located at 501, 505, and 509 W. Jackson Avenue. In 2014, a second fire destroyed the warehouses located at 517, 519, 523, and 525 W. Jackson Avenue.

Prior Phase I Environmental Site Assessments (ESA) and Phase II ESAs performed by S&ME and Tetra-Tech in 2009 and 2015, respectively, identified recognized environmental conditions (RECs) related to previous industrial use of the site and identified impacted environmental media through sampling and chemical laboratory analyses. The results of the previous soil sampling identified arsenic, lead, cobalt, manganese, and thallium at concentrations that exceeded the corresponding EPA RSLs. Passive soil vapor samples identified various petroleum-related compounds. Active soil gas testing indicated benzene concentrations that exceeded the corresponding calculated VISL concentrations for carcinogenic risk under a residential scenario. Groundwater samples collected at the site contained metals, but none of the concentrations exceeded EPA Maximum Contaminant Levels (MCLs). In addition, ACM was identified in the building remnants remaining onsite after the fire.



PETROLEUM HYDROCARBON IMPACTED SOIL REMOVAL

DEBRIS PILE REMOVED FROM THIS AREA

Additional Assessment

Using the 2016 Grant, S&ME first performed additional assessment to supplement data from the previous site assessment activities, addressing data gaps and evaluating the need for VI mitigation during site redevelopment. Additional assessment included a subcontracted ground-penetrating radar (GPR) survey, followed by the collection and laboratory analysis of passive and active soil gas samples, soil samples, groundwater samples, as well as suspect asbestos and LBP samples from the site. Contaminants, including petroleum hydrocarbons, metals, PAHs and VOCs were identified in the soil and soil gas samples.

The EPA VISL calculator was used to evaluate the VI carcinogenic risk. The results of VISL screening under a residential or commercial scenario identified a VI carcinogenic risk for several compounds including benzene 1,3-butadine and naphthalene.

Both ACM and LBP were detected in the demolition debris, which was sampled to further characterize this material for disposal purposes.

Based upon the findings compiled from both the S&ME and Tetra Tech assessment activities, an updated Analysis of Brownfield Cleanup Alternatives (ABCA) was prepared for review by the City, TDEC and EPA. The updated ABCA recommended cleanup alternatives for addressing surface and subsurface soil, ACM, and vapor intrusion concerns at the site, as well as a BVA to address environmental concerns during future redevelopment. The following cleanup activities were completed using the Grant funds.

BEFORE, DURING AND AFTER THE REMOVAL OF PETROLEUM HYDROCARBON-IMPACTED SOIL AT THE McCLUNG WAREHOUSES SITE

REMOVAL OF DEMOLITION DEBRIS AT THE McCLUNG WAREHOUSE SITE

Draft BVA

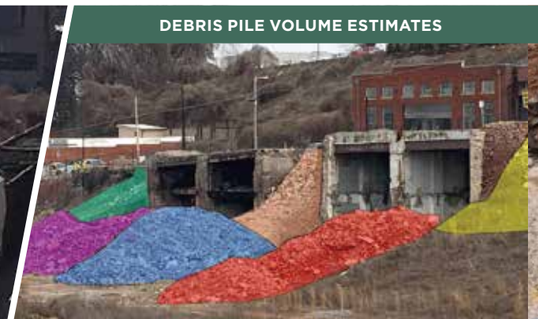
A draft BVA was prepared, and addresses considerations for construction worker contact with impacted media during redevelopment, steps to limit site occupant contact with impacted soil after redevelopment, and also addresses the VI potential, with a recommendation for design and installation of a vapor mitigation system, if warranted, based on redevelopment plans.

Excavation and Disposal of Contaminated Soil

A total of 131 tons of petroleum hydrocarbon-impacted soil was excavated from the eastern portion of the site and transported to Domermuth Environmental Services for interim bioremediation prior to disposing in a Class I Subtitle D landfill. The excavation was then backfilled with rock, and the area was repaved by the City.

Removal and Disposal of Debris Containing ACM and LBP

In addition to the soil excavation mentioned above, 258 cubic yards of ACM and LBP impacted demolition debris was removed from the site and transported to Chestnut Ridge Landfill for disposal. Approximately 500 cubic yards of demolition debris containing ACM and LBP remain on the site with an additional 200 cubic yards ramped along Jackson Avenue. The debris is from the demolition of the former warehouse structures after fires in 2007 and 2014. Since the ACM cannot feasibly be segregated from these debris piles, they would be considered asbestos waste, and should be handled accordingly. Removal of the material ramped along Jackson Avenue is not recommended until site redevelopment is planned.



DEBRIS PILE VOLUME ESTIMATES

PETROLEUM IMPACTED SOIL EXCAVATION AREA

DEBRIS PILE AT FORMER WAREHOUSE

BACKFILLED AREA FOLLOWING PETROLEUM IMPACTED SOIL EXCAVATION

What's Next for the Former McClung Warehouses Site?

The City envisions mixed-used redevelopment of the former McClung Warehouses site. The remaining surface and subsurface soil contain limited detections of dieldrin and metals such as arsenic, aluminum, iron, cobalt, lead, manganese, vanadium, and thallium at concentrations that warrant consideration during redevelopment. The draft BVA has been prepared to address these issues through applicable land-use restrictions and to provide liability protection for the future site owners.

Although some areas of elevated metals were also detected in the soil, they appeared to be generally isolated and ranged from surficial soils to deeper (greater than eight feet below ground surface) soil horizons. The future use and layout of the site has not yet been determined but would likely have a large building/parking area footprint. This type of redevelopment would limit residential exposure to subsurface soils simply based on the limited landscaped areas envisioned in this urban setting. Rather than spending cleanup funds to remove metals that may not pose a risk to human health or environment in the final redevelopment scenario, S&ME recommended addressing this issue through applicable land-use restrictions and the BVA. The BVA includes a provision for placement of buildings, parking areas, at least two feet of clean soil, or another type of TDEC-approved contact barrier over the existing ground surface as warranted to limit exposure to metals, if the redevelopment includes residential use.

As site redevelopment plans are considered, vapor intrusion mitigation may be warranted. There was insufficient information regarding future use to design and install a vapor mitigation system using the Grant, but the draft BVA addresses the VI potential, with a recommendation for design and installation of a vapor mitigation system, if warranted based on redevelopment plans.

Project Contacts:

Anne Wallace, Deputy Director, Office of Redevelopment, *awallace@knoxvilletn.gov*
Liz Porter, Senior Project Manager/Vice President, S&ME, *lporter@smeinc.com*

The city plans to make both properties available for private redevelopment when the sites are rehabilitated. More information is available at: knoxvilletn.gov/cleanupgrants

Acknowledgments:

ENVIRONMENTAL PROTECTION AGENCY

Ms. Olga Perry, Brownfield Project Manager, Officer & Designated Approving Official

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Ms. Paula Middlebrooks, Environmental Consultant,
Nashville Office, Division of Remediation

Ms. Erin Sutton, Brownfield Coordinator,
Knoxville Field Office, Division of Remediation

Mr. Justin Fisher, CPSS, CHMM,
Knoxville Field Office, Division of Remediation

Mr. Lee Baron, CHMM,
Knoxville Field Office, Division of Remediation

ROBIN EASTER DESIGN

Benjamin Finch, Newsletter & Final Report Designer

Thanks to all the neighbors, adjacent business owners, property owners and members of the general public who participated in this process through the public meetings and receiving the newsletters about these sites.

USING THE EPA CLEANUP GRANT, FUNDS WERE EXPENDED AS SUMMARIZED BELOW TO COMPLETE THE FOLLOWING ACTIVITIES:

	SANITARY LAUNDRY	McCLUNG WAREHOUSES
CITY PROJECT MANAGEMENT & ADMINISTRATIVE	$5,000	$5,000
PROGRAM DEVELOPMENT, MANAGEMENT & REPORTING	$21,000	$21,500
PUBLIC INVOLVEMENT/COMMUNITY OUTREACH	$11,000	$10,000
ADDITIONAL SITE CHARACTERIZATION & CLEANUP PLANNING	$50,000	$60,000
CLEANUP IMPLEMENTATION	$153,000	$83,500
GRANT TOTAL	$240,000	$180,000

Additional information regarding the sites is available in the following deliverables generated using Grant funds and found on the City of Knoxville Website at www.knoxvilletn.gov/cleanupgrants

Quarterly Newsletters (Beginning in Spring 2018, once site activities were initiated)
Brownfields Cleanup Cooperative Agreement Work Plans
Generic and Site-Specific Quality Assurance Project Plans
Sanitary Laundry Additional Assessment Report
McClung Phase II Environmental Assessment Report
Analysis of Brownfield Cleanup Alternatives
Final Technical Reports
Final Community Report (combined for both sites)

CITY OF KNOXVILLE